NORTHCENTRAL UNIVERSITY
ASSIGNMENT COVER SHEET

Student: **Michael Higley-Vance**

THIS FORM MUST BE COMPLETELY FILLED IN

Follow these procedures: If requested by your instructor, please include an assignment cover sheet. This will become the first page of your assignment. In addition, your assignment header should include your last name, first initial, course code, dash, and assignment number. This should be left justified, with the page number right justified. For example:

DoeJXXX0000-1	1

Save a copy of your assignments: You may need to re-submit an assignment at your instructor's request. Make sure you save your files in accessible location.

Academic integrity: All work submitted in each course must be your own original work. This includes all assignments, exams, term papers, and other projects required by your instructor. Knowingly submitting another person's work as your own, without properly citing the source of the work, is considered plagiarism. This will result in an unsatisfactory grade for the work submitted or for the entire course. It may also result in academic dismissal from the University.

EDU7003-8 **Dr. Rebecca Watts**

Statistics **Activity #2: Graphs and Descriptive Statistics**

Comments:

Faculty Use Only

Michael, your work on this assignment is exceptionally good. Your explanations for how you solve the problems are very thorough and very good. Your calculations are very accurate. You understand the different types of charts and graphs (frequency, stem-and-leaf, bar charts, box plots and histograms). I did make a few notes about the bar chart and histogram. The independent variable is always plotted on the x-axis and the frequency (or the dependent variable in scatterplots) is always plotted on the y-axis. Your calculations of the mean, median, mode, and standard deviation are exceptionally good. Your work on the box plot is very good. I have posted some documents in the course discussion forum that should help you with activity 3. Let me know if you have questions.

11/26/13 3:00 AM
Deleted: <Faculty comments here>

<Faculty Name> <Grade Earned> <Writing Score> <Date Graded>

Data File 2

Chapter Three (Show all your work)

1) A teacher asked each of her students how many novels they had read in the previous six months. The results are shown below.

0	1	5	4	2	1	3	2
2	7	2	5	0	1	0	1
1	2	6	0	2	3	1	2
7	1	4	2	3	1	7	0
0	2	1	1	0	6	1	7

Construct a frequency table for the number of novels read.

Novels Read	Frequency
0	7
1	11
2	9
3	3
4	2
5	2
6	2
7	4

good

2) The frequency table shows the weights in ounces of 30 stones

Weight (oz)	Number of Stones
1.2-1.6	5
1.7-2.1	2
2.2-2.6	5
2.7-3.1	5
3.2-3.6	13

Use the above information to construct a cumulative frequency table for the data.

Weight	Stones	Rel Frequency	Cum Frequency
1.2-1.6 oz	5	5/30 = 16 2/3%	5

1.7-2.1 oz	7	2/30 = 6 2/3%	2 + 5 = 7
2.2-2.6 oz	12	5/30 = 16 2/3%	5 + 2 + 5 = 12
2.7-3.1 oz	17	5/30 = 16 2/3%	5 + 5 + 2 + 5 = 17
3.2-3.6.1.1 oz	30	13/30 = 43 1/3%	13 + 5 + 5 + 2 + 5 = 30
		100%	**30**

11/26/13 2:54 AM

Comment [1]: This would be the number of stones within the category. You add them to determine cumulative frequency, which you did correctly.

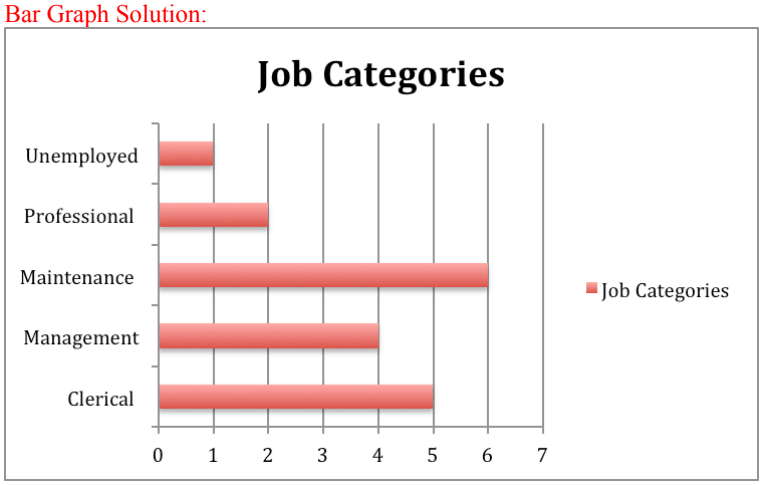
3) Use the following data to construct a bar chart.

Job categories

Clerical	Management	Maintenance	Professional	Unemployed
5	4	6	2	1

Create a bar graph and place the above data in a bar graph.

Bar Graph Solution:



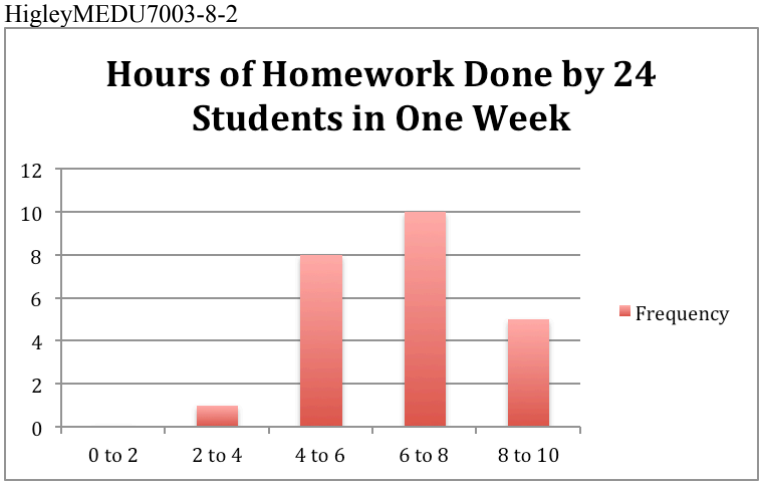
Michael, this is a very good bar graph. For the sake of APA, the different job categories should be plotted on the x-axis and the frequencies should be plotted on the y-axis.

4) The data below are the numbers of hours of homework done as reported by 24 high school juniors for the last week in September 2006.

6, 5, 6, 4, 6, 6, 9, 7, 6, 3, 8, 5, 5, 8, 6, 5, 8, 6, 5, 7, 5, 8, 7, 4

Create a histogram using the above data. Use bin width (size of the bar) of 2 hours.

Histogram Solution:



Very good on the histogram! There is a way to move the bars together such that there is not space between the bars. This is difficult to work with in Excel.

5) Examine the stem and leaf plot below. Find the original data from the stem and leaf plot.

Stem	Leaves
1	1,8 6
2	1,1,3,7
3	1,3,3,8,9
4	3,4

11, 18, 16, 21, 21, 23, 27, 31, 33, 33, 38, 39, 43, 44
good

6) Create a stem and leaf plot with the following data.

10, 12, 33, 25, 22, 18, 19, 31, 28, 22, 13, 15, 15, 20, 21, 35, 32

Stem	Leaves
1	0,2,3,5,5,8,9
2	0,1,2,2,5,8
3	1,2,3,5

good

Chapter Four (Show all your work)

1) The students of Hugh Logan's math class took the Scholastic Aptitude Test. Their math scores are shown below. Find the mean score.

552 593 358 352 537
349 357 596 470 482

Solution: To find the mean, we add the numbers shown above and divide by ten (ten representing the total number of number sets also shown above):

552 + 593 + 358 + 352 + 537 + 349 + 357 + 596 + 470 + 482 = 4646

4646 ÷ 10 = 464.6

The mean score is 464.6 - good

2) The salaries of ten randomly selected physicians are shown below. Find the median salary.

$105,000	$149,000	$163,000	$214,000	$225,000
$116,000	$111,000	$791,000	$240,000	$178,000

Solution: To find the median, we first sort the data in ascending order:
$105,000, $111,000, $116,000, $149,000, $163,000, $178,000, $214,000, $225,000, $240,000, $791,000
There are ten salaries with two values in the middle of the list: $163,000 and $178,000. Therefore the median lies halfway between these two values.

The median is calculated by adding these numbers and dividing by 2: the median salary = $163,000 + $178,000 = $341,000 ÷ 2 = $170,500

The median salary is $170,500 good and good explanation

3) Find the mode(s) for the given sample data.

20, 43, 46, 43, 49, 43, 49

Solution:
The mode is the number that occurs most often in the list of numbers above. **The mode, for the list of numbers above is 43 good**

4) The mathematics SAT scores of the seven students in a mathematics seminar are 533, 553, 578, 586, 619, 626, and 633. Suppose that the student with the score of 533 drops the seminar and is replaced by a student with a score of 765. What will happen to the mean and the median scores of the class? Explain.

Solution:
Mean is commonly called as average. Mean or average is defined as the sum of all the given elements divided by the total number of elements. Median is the middle value of the given numbers or distribution in their ascending order. To find the mean = **sum of elements / number of elements**. Median is the average value of the two middle elements when the size of the distribution is even. To find the median of a group of elements, count the numbers given and calculate using the formula **(n+1)/2** and to find the mean. good explanation Michael.

	1	2	3	4	5	6	7	Sum
Original	533	553	578	586	619	626	633	4128

Replacement	553	578	586	619	626	633	765	4360

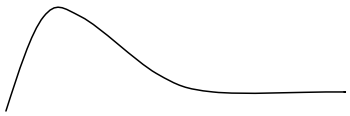
	Mean	Median
Original	4128 ÷ 7 = 589.7143	**(7+1)/2 = 8/2 = 4** indicates position of the number representing the Median. The number at 4th position is **586.**
Replacement	4360 ÷ 7 = 622.8571	**(7+1)/2 = 8/2 = 4** indicates position of the number representing the Median. The number at 4th position is **619.**

Both scenarios increased. Since the mean is the average score, dropping the lowest score and adding a higher score will increase the average. The median is the middle score, so adding a new highest score and dropping the lowest has the effect of moving the middle score up to the next potential student. --very good explanation

You can replace one score in a distribution, and the mean will change. However, the median does not always change with a change in one score.
If you add additional scores, both the mean and median will likely change.

5) Suppose there are 400 students in your school class. What class rank is the 20th percentile?

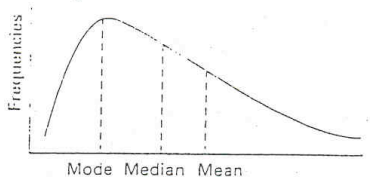
Solution:
The easiest equation to start with is 100 divided by 20 = 5. To break the larger class into 20 percent sections divide the total number of students by 5. 400/5 = 80, **so 80 is the 20th percentile.**

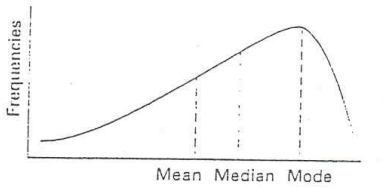
6) 

Look at the above distribution. What type is it and why?

Solution:
A distribution is right-skewed if its values are more spread out on the right side. A right skewed distribution pulls the mean and the median to the right, i.e. to values greater than the mode.

I pasted a diagram here to help remember the relationship between the mean, median and mode in skewed distributions. In a normal distribution, the three values should be equal or close to equal. If the tail points toward the right, the distribution is right skewed or positively skewed. If the tail points toward the left, the distribution is said to be left skewed or negatively skewed.





6) What is the range and standard deviation for the following data:

2, 6, 15, 9, 11, 22, 1, 4, 8, 19

Solution:
The range is the highest value minus the lowest value: 22 - 1 = 21
The range is 21

The standard deviation is the single number that is most usually used to describe variation. The following steps calculate the standard deviation:

1. Compute the mean of the data set:

1	2	4	6	8	9	11	15	19	22	
					1 + 2 + 4 + 6 + 8 + 9 + 11 + 15 + 19 + 22 =					**97**

97÷10 = 9.7

Find the deviation from the mean for every data value by subtracting the mean from each data value and find the squares of all the deviations from the mean:

9.7 – 1 =	8.7		$(8.7)^2$ =	75.69
9.7 – 2 =	7.7		$(7.7)^2$ =	59.29
9.7 – 4 =	5.7		$(5.7)^2$ =	32.49
9.7 – 6 =	3.7		$(3.7)^2$ =	13.69
9.7 – 8 =	1.7		$(1.7)^2$ =	2.89
9.7 – 9 =	.7		$(.7)^2$ =	0.49
9.7 – 11 =	-1.3		$(-1.3)^2$ =	1.69
9.7 – 15 =	-5.3		$(-5.3)^2$ =	28.09
9.7 – 19 =	-9.3		$(-9.3)^2$ =	86.49
9.7 – 22 =	-12.3		$(-12.3)^2$ =	151.29

2. Add all the squares of the deviations from the mean:

9.7 – 1 =	8.7		$(8.7)^2$ =	75.69

9.7 – 2 =	7.7		$(7.7)^2$ =	59.29
9.7 – 4 =	5.7		$(5.7)^2$ =	32.49
9.7 – 6 =	3.7		$(3.7)^2$ =	13.69
9.7 – 8 =	1.7		$(1.7)^2$ =	2.89
9.7 – 9 =	0.7		$(.7)^2$ =	0.49
9.7 – 11 =	-1.3		$(-1.3)^2$ =	1.69
9.7 – 15 =	-5.3		$(-5.3)^2$ =	28.09
9.7 – 19 =	-9.3		$(-9.3)^2$ =	86.49
9.7 – 22 =	-12.3		$(-12.3)^2$ =	151.29
				452.1

3. Divide the sum by the total number of data values minus 1:
   $452.1 \div (10 - 1) =$ **50.23**

4. Find the square root of this quotient: $(50.23)^2 =$ 7.09
   Standard deviation is 7.09

Very good calculations Michael.

7) Use the following data to determine 1) the five-number summary and 2) create a boxplot.

2.5, 3.3, 4.2, 5.9, 6.8, 7.2, 7.7, 8.5, 9.2, 9.9, 10.5

A 5-number summary is a set of 5 descriptive statistics for summarizing a continuous data set. This is a simple but very useful way of summarizing data for several reasons: the median gives a measure of the centre of the data, the minimum and maximum give the range of the data, and the 1st and 3rd quartiles give a sense of the spread of the data.

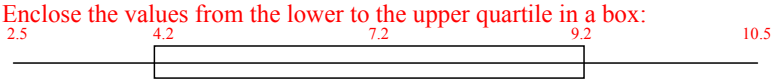
It consists of the data sets below:

Low Value		Lower Q.			Median			Upper Q.		High Value
2.5	3.3	4.2	5.9	6.8	7.2	7.7	8.5	9.2	9.9	10.5

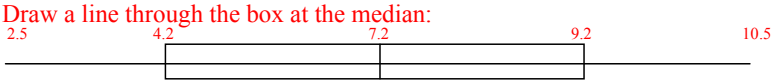
Solution: **The five-number summary is 2.5, 4.2, 7.2, 9.2, 10.5**

To create a boxplot using the data given:
Step 1: Draw a number line that spans all the values in the data set:

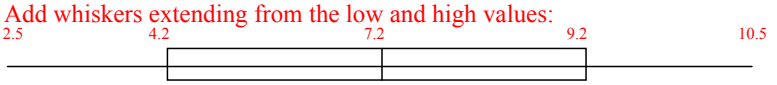
Step 2: Enclose the values from the lower to the upper quartile in a box:

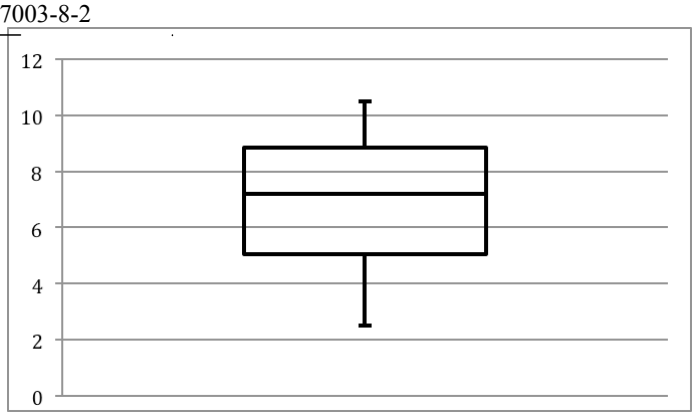


Step 3: Draw a line through the box at the median:



Step 4: Add whiskers extending from the low and high values:





Outstanding work Michael.

References

Bennett, J., Briggs, W., & Triola, M. (2013). *Statistical reasoning for everyday life*. (4th ed.) Boston: Pearson Education, Inc.